CONFIDENTIAL

SUPERIOR COURT OF THE STATE OF WASHINGTON
FOR KING COUNTY

STATE OF WASHINGTON,	x	
	x	
Plaintiff,	x	
v.	x	Civil Action No.
	x	96-2-15056-8SEA
AMERCIAN TOBACCO,	x	
et. al.,	x	
	x	
Defendants.	x	
	x	

* *

DEPOSITION OF DANIEL M. TENG

* *

November 19, 1997

Richmond, Virginia

ORIGINAL

CHANDLER & HALASZ, INC.
Court Reporters
P.O. Box 9349
Richmond, Virginia 23227
Reported by: Tanya L. Wood, RPR

2062823424

http://legacy.library.ucsf.edu/tid/wkq07a00/pdf
Support provided by the Tobacco Industry Documents.ucsf.edu/docs/hxgl0001

Deposition of DANIEL M. TENG, taken by and before Tanya L. Wood, RPR, Notary Public in and for the Commonwealth of Virginia at large, pursuant to Article 31 of the Civil Practice Law and Rules, and By Notice to Take Depositions; commencing at 10:00 a.m., November 19, 1997, at the Law Offices of Hunton & Williams, 951 East Byrd Street, Richmond, Virginia.

Appearances:

HAGENS & BERMAN
By: JENIPHR A. E. BRECKENRIDGE, ESQ., attorney, of counsel for the plaintiff, State of Washington

ARNOLD & PORTER
By: ALFRED T. McDONNELL, ESQ., attorney, of counsel for Philip Morris and the deponent

HELLER, EHRMAN, WHITE & McAULIFFE
By: MAURA SCOTT BLANK, ESQ., attorney, of counsel for Philip Morris

HUNTON & WILLIAMS
By: KERRY L. GUM, ESQ., attorney, of counsel for Philip Morris and the deponent

2062823425

http://legacy.library.ucsf.edu/tid/wkq07a00/pdf
Support provided by the Tobacco Industry Documents Library at the University of California, San Francisco. http://www.industrydocuments.ucsf.edu/docs/hxgl0001

I N D E X

DEPONENT

DANIEL M. TENG

Examination By:	Page
Direct - Ms. Breckenridge	4

E X H I B I T S

TENG	Page
1	60
2	66
3	72

2062823426

http://legacy.library.ucsf.edu/tid/wkq07a00/pdf
Support provided by the Tobacco Industry Documents Library at the University of California, San Francisco. http://www.industrydocuments.ucsf.edu/docs/hxgl0001

DANIEL M. TENG

was sworn and testified as follows:

DIRECT EXAMINATION

BY MS. BRECKENRIDGE:

Q Good morning, Dr. Teng. My name is Jeniphr Breckenridge. We met off the record. We're here today to take your testimony in the case of the State of Washington versus Philip Morris and other tobacco companies.

Before we start, I'd like to go over a couple of ground rules with you that I'm sure your lawyers have gone over with you.

It's important that we understand each other today. If at any time you don't understand my question or any terminology I use in a question, if you could let me know, and I will try to rephrase it for you.

If at any time you feel or want, you need or want a break, let me know, and I'll certainly accommodate you.

And the testimony you are giving today will be under oath; do you understand that? It's the same as giving testimony in court?

A Yes.

2062823427

http://legacy.library.ucsf.edu/tid/wkq07a00/pdf
Support provided by the Legacy Tobacco Documents Library at the University of California, San Francisco. http://industrydocuments.ucsf.edu/docs/hxgl0001

Q Okay. Has he been sworn?

Thank you.

Could you start out by stating your full name and address for the record, please.

A Daniel M. Teng, T as in Tom, E as in English, N as in news, and G as in George.

Q

A

REDACTED

Q Are you presently an employee of Philip Morris?

A No, I'm not.

Q Where are you employed today, Dr. Teng?

A

Q

REDACTED

A

Q

A

Q Are you represented by counsel here today?

A Yes.

Q And is Mr. McDonnell representing you?

A Yes.

Q Did you retain Mr. McDonnell or did

2062023428

http://legacy.library.ucsf.edu/tid/wkq07a00/pdf
Suntid/wkq07a00/pdf.industrydocuments.ucsf.edu/docs/hxgl0001

Philip Morris retain Mr. McDonnell for you?

A Philip Morris does.

Q And did you contact Philip Morris to ask them to provide a lawyer or did Philip Morris contact you and offer to provide a lawyer?

A Philip Morris contacted me.

Q Have you ever been deposed before, Dr. Teng?

A Pardon?

Q Have you ever been deposed before? Have you ever had your deposition taken before?

A No.

Q Have you ever testified as a witness in any trial?

A No.

Q Have you ever been a witness in any type of governmental proceeding?

A No.

Q Have you ever prepared a declaration or affidavit to be used in a lawsuit?

A No.

Q Have you ever been asked to be a witness in a trial or a legal proceeding?

A No.

Q Have you ever been subpoenaed by a

2062823429

http://legacy.library.ucsf.edu/tid/wkq07a00/pdf
Support provided by the Industry Documents Library: industrydocuments.ucsf.edu/docs/hxgl0001

Grand Jury?

A No.

Q Have you ever been consulted by anyone at Philip Morris who was subpoenaed by a Grand Jury?

A No.

Q Did you meet with your lawyers to prepare for your deposition today?

A Yes.

Q Who did you meet with?

A Mr. McDonnell.

Q Mr. McDonnell. How many times did you meet with him?

A Oh, three or four times.

Q And how long did you meet with him each time?

A Couple hours.

Q When did you start meeting with Mr. McDonnell?

A Maybe about a month ago.

Q And did you meet with any other lawyers, Miss Blank or Miss Gum?

A Miss Gum, Mr. Jim Schardt, S-C-H-A-R-D-T.

Q Did you review documents to prepare for your deposition?

A No.

2062823430

http://legacy.library.ucsf.edu/tid/wkq07a00/pdf
Support provided by the Tobacco Industry Documents Library. https://www.industrydocuments.ucsf.edu/docs/hxgl0001

Q What did you do to prepare for your deposition?

A I didn't have anything to prepare.

Q Did you just meet and discuss your deposition with your lawyers?

A Yes.

Q Did they ask you to review any deposition transcripts of other Philip Morris employees?

A No.

Q Do you know what a deposition transcript is?

A No, I'm not sure.

Q Okay. A deposition transcript would be what our court reporters here today are doing, a court reporter records the testimony given by an employee or by a witness; were you asked to review any sort of recording of any other Philip Morris employee's deposition?

A Reviewing, no.

Q Were you asked to read?

A No.

Q When did you begin working for Philip Morris?

A 1967.

Q What was your -- did you go to

2062823431

http://legacy.library.ucsf.edu/tid/wkq07a00/pdf
Support provided by the Industry Documents Library: http://industrydocuments.ucsf.edu/docs/hxgl0001

Philip Morris out of school?

A Yes.

Q Where did you go to school? Where did you go to undergraduate school?

A National Taiwan University in Taipei, Taiwan.

Q What did you study at National Taiwan University?

A Agricultural chemistry.

Q And did you receive a degree?

A Yes, B.S.

Q And what's the B.S. in, agricultural chemistry?

A Yes.

Q What was the next degree you received?

A Master's degree.

Q And where did you receive your master's degree from?

A Utah State University.

Q I'm sorry, did you say Utah?

A Yes.

Q What area was your master's degree in?

A Plant biochemistry and nutrition.

Q Did you write a thesis to obtain your master's degree?

2062823432

http://legacy.library.ucsf.edu/tid/wkq07a00/pdf
Stanford Research Institute industrydocuments.ucsf.edu/docs/hxgl0001

A Yes.
Q What was the topic of your thesis?
A Oh, my.
Q If you recall?
A It's been a long time. It's something related to iron chlorosis.
Q What year did you receive your master's degree?
A 1963.
Q And then did you go on to receive a Ph.D.?
A Yes.
Q Where did you receive your Ph.D. from?
A From Utah State University.
Q What was area of your Ph.D.?
A Again, in plant nutrition and biochemistry.
Q Can you explain to me what plant nutrition and biochemistry is.
A It's a study related to the biochemical changes in plant on the nutrition, nutrition or effect to the plant.
If you need to spell it out, please let me know.
Q Did you write a thesis as part of your

2062823433

http://legacy.library.ucsf.edu/tid/wkq07a00/pdf
Support provided by the Industry Documents Library: http://industrydocuments.ucsf.edu/docs/hxgl0001

Ph.D. program?

A Yes.

Q Do you recall the subject of your thesis?

A Again, it's related to iron on the enzyme of chlorophyll, C-H-L-O-R-O-P-H-Y-L-L, synthesis.

Q After you received your Ph.D., did you go to work at Philip Morris?

A Yes.

Q How were you hired at Philip Morris? Did they come to your campus and recruit or did you contact Philip Morris?

A Oh, I contact Philip Morris.

Q And why were you interested in working at Philip Morris?

A Because they do plant, you know, my area is plant.

Q When you contacted Philip Morris, did you have a particular project you wished to pursue at Philip Morris?

A No.

Q What were you hired to do in your first job at Philip Morris?

A I'm not sure they had something particular in mind to hire me.

Q What was -- what was your first position,

2062823434

http://legacy.library.ucsf.edu/tid/wkq07a00/pdf
Support provided by the Industry Documents Library: http://www.industrydocuments.ucsf.edu/docs/hxgl0001

title?

A Associate scientist.

Q And which department were you an associate scientist in?

A In chemical research.

Q Was chemical research part of a larger division or directorate of Philip Morris?

A It was in the Research Division.

Q What was the function of the Chemical Research Department?

MR. McDONNELL: Objection. Unclear.

BY MS. BRECKENRIDGE:

Q Do you understand the question, Dr. Teng?

A Would you repeat it, please.

Q Yes, I can ask it a different way. What was the purpose of the Chemical Research Department?

A They are a group of people working on organic synthesis for flavors.

Q And could you explain to me what organic synthesis is, please.

A You are making organic compounds is something with -- which contains carbon, like any of the nitro living things, compounds like that.

Q How long did you remain an associate scientist in the Chemical Research Department?

2062823435

http://legacy.library.ucsf.edu/tid/wkq07a00/pdf
Support provided by the Industry Documents Library: industrydocuments.ucsf.edu/docs/hxgl0001

A Oh, probably about year and a half to two.

Q Do you recall projects which you worked on during that period?

A Yes. We are trying to isolate an enzyme called chlorogenic acid oxidase, C-H-L-O-R-O-G-E-N-I-C, A-C-I-D, O-X-I-D-A-S-E.

Q Why were you trying to isolate chlorogenic acid oxidase?

A Because we are trying to determine, by removing the chlorogenic acid tobacco, it would improve the characteristic of the smoke.

Q Why were you interested in removing the chlorogenic -- maybe I should ask you to repeat the answer.

MR. McDONNELL: I want to object on the grounds that when you say "you," it's unclear, at least to me, whether you are asking him for his own view or Philip Morris's, if he knows it.

MS. BRECKENRIDGE: I can rephrase the question once I understand what I'm asking.

Could you repeat your last answer.

(The following answer was read:

"ANSWER: Because we are trying to

2062823436

http://legacy.library.ucsf.edu/tid/wkq07a00/pdf Stanford Libraries industrydocuments.ucsf.edu/docs/hxgl0001

determine, by removing the chlorogenic acid tobacco, it would improve the characteristic of the smoke.")

THE DEPONENT: I said can we remove the chlorogenic acid from tobacco to see whether it will improve, not the chlorogenic oxidase acid. Oxidase is the enzyme which would degrade chlorogenic acid.

BY MS. BRECKENRIDGE:

Q Why was Philip Morris interested in removing the chlorogenic acid from tobacco?

A There was some speculation that compounds might contribute to the bad subjective of the smoke.

Q And when you say "that compounds"?

A I'm talking about chlorogenic acid.

Q Thank you. Was this speculation related to a particular brand?

A No, I don't think so.

Q To your knowledge, was the only reason Philip Morris was interested in removing the chlorogenic acid from tobacco to improve the subjective flavor of the smoke?

A Yes.

Q Do you recall any other projects which you worked on as an associate scientist in the

2062823437

http://legacy.library.ucsf.edu/tid/wkq07a00/pdf
Suntid/wkq07a00.pdf industrydocuments.ucsf.edu/docs/hxgl0001

Chemical Research Division?

A I think that's the only one.

Q What was your next position at Philip Morris?

A Research scientist.

Q Was that in the Chemical Research Division?

A Yes.

Q Did you -- did your work change as a research scientist in the Chemical Research Division?

A No.

Q Were you still working on the same project you described?

A Yes.

Q How long did you remain a research scientist in the Chemical Research Division?

A Until 1979.

Q Were you successful in removing the chlorogenic acid from tobacco?

MR. McDONNELL: Again, when you say "you," I'm not sure whether you are asking him or the project --

BY MS. BRECKENRIDGE:

Q Was the project successful in removing chlorogenic acid from tobacco?

2062823438

http://legacy.library.ucsf.edu/tid/wkq07a00/pdf
Support provided by the Industry Documents Library: industrydocuments.ucsf.edu/docs/hxgl0001

A No.

Q Was it that you couldn't remove the chlorogenic acid from tobacco?

A First of all, we got to isolate the enzymes, and that's a long process.

Q Okay.

A And then you have to purify the enzyme, otherwise you don't know what's contributing to it. So you have to purify that. And that is a very long process. And after that, you try to apply that into tobacco to remove the chlorogenic acid. And at that time, someone thought, well, maybe it doesn't have anything to do with subjective, so we just stopped.

Q Okay. As a research scientist, were there other projects which you worked on?

A Yes.

Q What were some of the other projects you worked on?

A At that time, Philip Morris owns a chewing gum company, and there was the thought from the dental communities that the dental plaque formation comes from the formation of a larger old dextran. Dextran is synthesized from glucose. The polysaccharide, P-O-L-Y-S-A-C-H-A-R-R-I-D-E(sic) --

Q Thank you. We do appreciate it.

2062823439

http://legacy.library.ucsf.edu/tid/wkq07a00/pdf
Support provided by the Industry Documents Library: industrydocuments.ucsf.edu/docs/hxgl0001

Sometimes it's hard to deal with lay people.

A No, I understand that. But even for me, to just it's easy to write it down and then do it than trying to say it.

All right. So you have the polysaccharide formation and then the bacteria cells were deposit on top of that. The polysaccharide and then calcium or other mineral will get on top of the mouth, and then it harden and become dental plaque.

Q Were you employed by Philip Morris?

A Yes.

Q At the time you were working on this project?

A Yes. So the reason is trying to see if an enzyme called dextran, D-E-X-T-R-A-N-A-S-E, will degrade this polysaccharide, the mud. So the bacteria on the -- pour it on top of it, the calcium deposit on top of it. So you can remove the dental plaque.

Q Did this project have any relationship to Philip Morris's tobacco operations?

A No.

Q Were there other projects you worked on as a research scientist in the Chemical Research Division?

2062823440

http://legacy.library.ucsf.edu/tid/wkq07a00/pdf
Support provided by the Tobacco Industry Documents Library at the University of California, San Francisco
http://www.industrydocuments.ucsf.edu/docs/hxgl0001

A Yes.

Q Could you tell me those projects.

A At that time we are thinking, you know, if we are going to modify tobacco from the subjective standpoint, the easiest thing to do is using enzymes, E-N-G-Y-M-E(sic), enzymes, S.

Q What type of modifications to tobacco from a subjective standpoint was Philip Morris interested in accomplishing?

A At that time, we just looking at the basic model, basic approach. We didn't have anything particular in mind.

Q What attempts did Philip Morris make to modify tobacco with enzymes?

MR. McDONNELL: Are you asking about a particular time period?

BY MS. BRECKENRIDGE:

Q I'm asking about work that you did as a research scientist in the Chemical Research Division while you were there on a project, which I believe you described as modifying tobacco from the subjective standpoint through the use of enzymes?

A None.

Q And when you say "none," are you saying that this was not attempted?

2062823441

http://legacy.library.ucsf.edu/tid/wkq07a00/pdf Document hosted at industrydocuments.ucsf.edu/docs/hxgl0001

A No, what I said was we are trying to see if this kind of approach can be used. So we have to do the basic study of --

Q All right.

A Okay. We want to know from the basic standpoint can enzyme be applied, because enzyme is a natural-occurring substance, natural occurring, and the best place is the tobacco plant itself has its own enzymes. So we try to understand if we can use the enzyme in tobacco itself by manipulating the curing process.

Q Were you involved in attempts to do this while you were a research scientist in the Chemical Research Division?

A Yes.

Q And were you able to modify the subjective character of tobacco by using enzymes?

A We haven't gotten that far. What I'm trying to say is we are still trying to get to the basic of the curing process. It is an art. It's an art form. And the farmers, the tobacco farmers learn to do the curing by their experience, and we try to understand what is going on.

Q And how did you try to understand it?

A By following what they are doing and

2062823442

http://legacy.library.ucsf.edu/tid/wkq07a00/pdf
Support provided by the Legacy Tobacco Documents Library at the University of California, San Francisco. http://www.industrydocuments.ucsf.edu/docs/hxgl0001

watching them and take samples, to the timing, the changes of enzymatic activities in the tobacco material during different stages of curing.

Q What was your role in this project?

A I think I was the project leader.

Q Did the project have a name?

A We called it biochemical modification of tobacco.

Q And do you recall, was that Project Number 1901?

A Yes.

Q Do you recall what year the project began?

A I think it's somewhere around 1970.

Q And did the project have an ending date?

A I think we might have done that for three or four seasons.

Q Did you formulate conclusions at the end of the project?

A We know the enzymatic changes of some of the enzymes in tobacco are control by the condition of the curing.

Q Can you tell me what enzymatic changes take place in tobacco.

MR. McDONNELL: During the curing

2062823443

http://legacy.library.ucsf.edu/tid/wkq07a00/pdf
Support provided by the Industry Documents Library: http://industrydocuments.ucsf.edu/docs/hxgl0001

process?

MS. BRECKENRIDGE: If that's a relevant -- I'm not sure if that's relevant.

MR. McDONNELL: All right.

MS. BRECKENRIDGE: If that's meaningful. I could ask a more basic question.

BY MS. BRECKENRIDGE:

Q Are there certain enzymatic changes that take place in tobacco during curing?

A Yes.

Q Is that what you were studying during the project you are testifying about?

A Yes.

Q Can you tell me what enzymatic changes take place in tobacco during curing.

A I think there are too many to even mention.

Q Okay.

A But the thing is, in order to study, you should be able to have the methodology for isolating in determining each enzyme activity, so what we did was he just used the methods which available, and those are the enzymes we studied.

Q Is there a way to describe the enzymes which you studied during this project?

2062823444

http://legacy.library.ucsf.edu/tid/wkq07a00/pdf
Support provided by the Industry Documents Library: http://industrydocuments.ucsf.edu/docs/hxgl0001

A You mean the kinds?

Q Yes.

A I think we did chlorogenic acid oxidase, I think we did the breakdown of starch. So that means -- I mean, amylase, A-M-Y-L-A-S-E, there are a couple of amylase, one is alpha and one it beta. I don't remember.

Q Okay. Now, are the enzymatic changes different than the enzymes you just described?

A Would you repeat that question, please.

Q The list that you just gave, is that a list of enzymes?

A Yes.

Q Is that different from enzymatic changes?

A From enzyme to enzyme?

Q I'm wondering what an enzymatic change is.

A Okay.

Q Or --

A The activity. Let me try to give an example. Like you are going to tenderize a piece of steak, you put meat tenderizer on it. The meat tenderizer you put on it is a enzyme which you break down, protein; okay. Protein was one. That's the enzyme which break down, protein; okay. If you

2062823445

http://legacy.library.ucsf.edu/tid/wkq07a00/pdf
Support provided by the Industry Documents Library: http://industrydocuments.ucsf.edu/docs/hxgl0001

sprinkle the meat tenderizer and just stick the whole thing into the oven right away and heat it up, you are not going to tenderize your meat, because the heat kills the enzyme activity. That means the potential of the enzyme. That's what we refer to as enzyme activity. Enzyme is the name of that catalyst. And how active or how -- how important is it to do the function is called enzyme activity.

Okay. So I think steak is a very good example. You stick into the oven, and that's it, it's gone, because you use the heat to kill it.

Q What conclusions did you reach at the end of the subject -- at the end of the project in terms of how enzymatic changes in tobacco could be controlled by the curing conditions?

MR. McDONNELL: Objection. Foundation.

THE DEPONENT: Could you repeat that again, please.

MS. BRECKENRIDGE: Could you read it back, please.

(The following question was read:
"QUESTION: What conclusions did you reach at the end of the subject -- at the end of the project in terms of how

2062823446

http://legacy.library.ucsf.edu/tid/wkq07a00/pdf
Support provided by the Tobacco Industry Documents Library at the University of California, San Francisco
http://www.industrydocuments.ucsf.edu/docs/hxgl0001

enzymatic changes in tobacco could be controlled by the curing conditions?"

THE DEPONENT: Well, you monitor the changes in enzyme activities of the enzymes I've mentioned by plotting it against the activity against the temperature profile and the moisture content of the tobacco during curing. We could sense that those enzymes or the enzyme activities were controlled by the curing process; i.e., the temperature and the moisture content.

BY MS. BRECKENRIDGE:

Q As a result of this project, did Philip Morris change its curing process?

MR. McDONNELL: Objection. Foundation.

A Philip Morris doesn't cure its own tobacco. Philip Morris buys it.

BY MS. BRECKENRIDGE:

Q Does Philip Morris -- do you know if Philip Morris prescribes the method of curing for those who cure the tobacco purchased by Philip Morris?

A No, we don't.

Q Why was Philip Morris interested in studying curing then, if you know?

2062823447

http://legacy.library.ucsf.edu/tid/wkq07a00/pdf
Support provided by the Industry Documents Library: industrydocuments.ucsf.edu/docs/hxgl0001

A That is just a basic interest, try to understand how things are done.

Q Was this project conducted on a particular type of tobacco?

A Yes, bright tobacco.

Q Were you ever involved in any projects to conduct similar studies on other types of tobacco?

A Yes.

Q What other types of tobacco?

A Burley tobacco.

Q Was the project involving Burley tobacco conducted at the same time?

A No.

Q When was the project on Burley tobacco conducted?

A I think it's somewhere around 1978.

Q Was a similar project conducted for any other type of tobacco?

A No.

Q What was the name of the project involving Burley tobacco?

A It's still under biochemical modification of tobacco.

Q What was the objective of the Burley project on the biochemical modification of tobacco?

2062823448

http://legacy.library.ucsf.edu/tid/wkq07a00/pdf
Support provided by the Industry Documents Library: http://www.industrydocuments.ucsf.edu/docs/hxgl0001

A Again, it's an attempt to understand the basic changes happening in curing of Burley tobacco.

Q Were there particular changes that the project was designed to study?

A I think just, you know, what are the methods available, that's the only thing we studied. So it's almost identical to bright tobacco.

Q How long did the Burley project last?

A Usually, we run three seasons, because you expect to see season-to-season variations. Whether this year is rained, it didn't rain, the first frost hit earlier.

Q Were there conclusions drawn at the end of the Burley project?

A Again, the enzymes that a man think involved in the conversion of green tobacco into a smokable product.

Q At the conclusion of the Burley project, did you determine that enzymatic changes in Burley tobacco could be controlled by conditions of curing?

A Yes, it can be controlled. But, again, it's -- it's an art. If you have to see the Burley curing, it's a barn and there are windows and doors, and they control the moisture. In this time, you

2062823449

http://legacy.library.ucsf.edu/tid/wkq07a00/pdf
Support provided by the Industry Documents Library: http://www.industrydocuments.ucsf.edu/docs/hxgl0001

cannot control the temperature that much, because you don't apply any artificial heat. You control the moisture. You don't want that to dry too fast. So, yes, the moisture can be controlled, by opening or closing the barn windows and the doors to control the enzyme activity.

I'll go back to the same example, the steak and meat tenderizer. You need the moisture for the enzyme to react. In steak's case, it's the protein. If you take the same meat tenderizer and put on beef jerky, it's not going to react, because you don't have any moisture there to react. So same way in tobacco curing. When you start it, the tobacco may have up to 90 percent in water content. If you take the green leaf and put into 100 degrees oven and dry it, you end up with about 10 percent of the solid waste. The rest is water.

So in this instance, if you control the moisture loss carefully, then the enzymes already in the tobacco itself will react and carry out the things it's supposed to do. So in Burley case, the moisture is very important. So, yes, curing can be used to control the enzyme activity and to control the curing.

Q Did either the bright or the Burley

2062823450

http://legacy.library.ucsf.edu/tid/wkq07a00/pdf
Support provided by the Tobacco Industry Documents.ucsf.edu/docs/hxgl0001

projects on the biochemical modification of tobacco determine any changes in the nicotine content of the tobacco as a result of the curing?

A Yes.

Q And what determinations were made regarding the nicotine content?

A Well, it's part of the standard test package. For instance, if you do a sample preparation, you get a tobacco extract and put into, I guess, chromatographic analysis. That same analysis will spit out many things. And nicotine is one of them.

Q What is the standard package of tests you referred to?

A In the analysis called Chemistry Department, they have the methodology of what can be tested.

Q Do you know what those tests are, other than the nicotine measurement?

A Sugars, like sucrose, starch, glucose, fructose, water solubles.

Q Were these measurements taken as part of the tobacco projects you are testifying about?

A Could you repeat that question again, please.

2062823451

http://legacy.library.ucsf.edu/tid/wkq07a00/pdf Source: http://www.industrydocuments.ucsf.edu/docs/hxgl0001

Q Yes, it wasn't a very good question. I'll just restate it.

Were all of these measurements done on the samples taken as part of the bichemical modification of tobacco projects?

MR. McDONNELL: And the projects, I'm sure this is what you mean, are the Burley and bright projects that he's described?

MS. BRECKENRIDGE: Yes, sir, thank you.

THE DEPONENT: Yes.

BY MS. BRECKENRIDGE:

Q What was the effect of curing on nicotine levels of the bright tobacco?

MR. McDONNELL: Objection. The question is unclear to me.

A I don't remember. Frankly, I don't remember which way it goes.

BY MS. BRECKENRIDGE:

Q Was nicotine content of the tobacco one of the factors that could be controlled through curing?

A I don't know.

Q Is -- would the nicotine content of tobacco be the result of enzymatic changes during curing?

2062823452

http://legacy.library.ucsf.edu/tid/wkq07a00/pdf
Support provided by the Industry Documents Library: http://industrydocuments.ucsf.edu/docs/hxgl0001

A I'm sure it's controlled by enzymatic reactions, but at that time, we didn't have the methodology of determining the enzymes involved.

Q Do you know if the curing effect -- affected the nicotine content of tobacco in these projects?

A I don't remember which way it will move, go up, go down, I don't remember.

Q Do you remember if it was affected one way or another?

A If I have to guess now, I'll say it probably is rather constant.

Q But that's just a guess, you don't recall?

A I don't recall. It's been a long time.

Q Yeah, I'm sorry. Was there a written report of Project 1901?

A Yes, I think so.

Q Do you know who authored that report?

A I think I did.

Q Can you tell me who else worked with you on Project 1901?

A Dr. Gerry Nixon, G-E-R-R-Y, and Mr. Bernie Semp, S-E-M-P, might have done also.

Q Were there other projects which you

2062823453

http://legacy.library.ucsf.edu/tid/wkq07a00/pdf Stanford Libraries industrydocuments.ucsf.edu/docs/hxgl0001

worked on as a research scientist in the Chemical Research Division?

MR. McDONNELL: During the same time period?

BY MS. BRECKENRIDGE:

Q Up until 1979?

A I think that's about all I did during that period.

Q Who did you report the information you gained in Project 1901 to?

A Originally, to Dr. Thomas Osdene, O-S-D-E-N-E, and then there are manager changes, to Dr. Bob Ikeda, I-K-E-D-A.

Q Do you know if Philip Morris used the information you gathered in the Project 1901 for any commercial purposes?

A I don't think so.

Q Was the work you did in Project 1901 the basis for any projects later; do you know?

A No, I don't think so.

Q What was your next position at Philip Morris after the senior --

A It was up to associate senior scientist.

Q And were you still in the Chemical Research Division?

2062823454

http://legacy.library.ucsf.edu/tid/wkq07a00/pdf
Support provided by the Tobacco Industry Documents Library. https://www.industrydocuments.ucsf.edu/docs/hxgl0001

A I think I was in Applied Research Division.

Q And can you tell me what the function of the Applied Research Division was at that time.

A Actually, it's a division you can go either way, you can go in to basic -- I don't think it's so easy to define it. You can go in to basic basic or you can do some application of the things available.

Q What type of projects were done in the Applied Research Division at that time?

A I had my 1901 and I think there was a physics group.

Q 1901 was the biochemical modification of tobacco?

A Yes.

Q And do you know what the physics group was doing during your tenure in the Applied Research Division?

A No, I don't.

Q Who did you report to as an associate senior scientist in the Applied Research Division?

A Dr. Bill Farone, F-A-R-O-N-E.

Q What was his title at that time?

A I think he was the director of applied

2062823455

http://legacy.library.ucsf.edu/tid/wkq07a00/pdf
Support provided by the Tobacco Industry Documents Library at the University of California, San Francisco. http://www.industrydocuments.ucsf.edu/docs/hxgl0001

research.

Q Is there a definition for applied research?

MR. McDONNELL: Objection. Vague. Definition?

MS. BRECKENRIDGE: I'm not sure what applied research means.

THE DEPONENT: It just created a directorship, and that position is just to be somewhere in the middle of between the development and research.

BY MS. BRECKENRIDGE:

Q Okay. How long were you an associate senior scientist in the Applied Research Division?

A Until I retire.

Q Were you working on the biochemical modification of tobacco during that entire time?

A Yes.

Q In 1979, when you became an associate senior scientist and moved to the Applied Research Division, how did the biochemical modification of tobacco project change, or did it change?

A At that time, we got involved in a study trying to modify nitrate.

Q And was that nitrate with an A?

2062823456

http://legacy.library.ucsf.edu/tid/wkq07a00/pdf
Stanford Libraries industrydocuments.ucsf.edu/docs/hxgl0001

A Yes.

Q Who was involved in that study?

A Bernie Semp and myself.

Q What was the objective of the study?

A Trying to reduce the nitrate in tobacco materials.

MR. McDONNELL: Are we near a --

MS. BRECKENRIDGE: This is a good breaking spot.

(Break)

BY MS. BRECKENRIDGE:

Q Dr. Teng, can you tell me how the biochemical modification of tobacco project evolved over time; is there a way to describe that?

MR. McDONNELL: Objection. Vague.

A I'm trying to -- I'm trying to understand the question.

BY MS. BRECKENRIDGE:

Q Okay. Then let me ask a different question.

Were there distinct stages of the biochemical modification of tobacco project?

A Most the time we are staying on the

2062823457

http://legacy.library.ucsf.edu/tid/wkq07a00/pdf
Support provided by the Industry Documents Library: http://industrydocuments.ucsf.edu/docs/hxgl0001

enzymatic changes of tobacco, whether the enzyme is commercially available or we have to isolate it from tobacco or and the enzyme which has already been in the tobacco plant itself, because tobacco plant is a living thing like us, we have enzymes to convert things we eat and tobacco plant also has all sorts of enzymes that will carry out the necessary metabolism.

Q Did you have different research objectives at different stages of the biochemical modification of tobacco project?

A Yes.

Q Who would be responsible for changing the objectives or --

A Either it came down from myself or it came down from the management.

Q And who would the management be?

A Whoever my manager was at that time.

Q Over the course of the project, did you look at different ways to modify tobacco?

A To actually modify it, no.

Q Was there one way you looked at to modify tobacco?

A What we tried to do was just to do the basic understanding, basic understanding of what's going on.

2062823458

http://legacy.library.ucsf.edu/tid/wkq07a00/pdf
Support provided by the Tobacco Industry Documents Project. industrydocuments.ucsf.edu/docs/hxgl0001

Q And when you say the basic understanding of what is going on, are you referring to what is going on during the curing process?

A Yes.

Q Are you referring to what is going on during other processes that tobacco goes through also?

A Like aging.

Q Are you referring to what is going on in other processes, other than curing and aging of tobacco?

A I think that's what I spent most of my time. I'm the farmer.

Q When you became an associate senior scientist in the Applied Research Division, your testimony was that you became involved in a study trying to modify nitrates in tobacco; is that correct?

A Yes.

Q Who proposed a study to modify nitrates?

A I understood it came from the vice person at that time, Dr. Seligman, S-E-L-I-G-M-A-N.

Q And was Dr. Seligman the vice president of research at the time?

A Yes.

2062823459

http://legacy.library.ucsf.edu/tid/wkq07a00/pdf Support by the Industry Documents Library: http://industrydocuments.ucsf.edu/docs/hxgl0001

Q Do you know why Philip Morris was interested in modifying nitrates?

A It's, again, a speculation, nitrate might be bad for the subjective and the burning characteristics of the cigarette.

Q As you use the term "subjective characteristic," does that mean anything more than taste?

A Smoking, taste, impact.

Q Anything else?

A That's all I know of.

Q Okay. What were the burning characteristics that it was speculated nitrate might be bad for?

A I'm not sure it's bad, but the thing is a cigarette got to produce certain number of puffs, let's say, it cannot be three puffs and it's gone, so it's usually maybe somewhere around ten puffs. So nitrate may cut it down, I don't know if I have to guess, maybe cut it down one puff.

Q How did you go about trying to modify nitrate in tobacco?

A Again, the best thing we can do was any enzymatic treatment. Again, it come into my area, it got to be, you know, enzyme-related, so it will be

2062823460

http://legacy.library.ucsf.edu/tid/wkq07a00/pdf
Support provided by the Industry Documents Library: http://www.industrydocuments.ucsf.edu/docs/hxgl0001

enzymatic treatment. And the best thing you can do is enzymatic treatment will be in the liquid form. And so the enzyme can react with the substrate. Does the compound, enzyme work on it. So the best thing you can have is in the liquid form, the nitrate is the liquid form.

So the best approach is to take tobacco extract and apply either enzyme or enzymes or microbial systems or put it the other way, by fermentation to change the nitrate.

Q Were you successful in changing the nitrate in this manner?

A Yes. But this was in the model system; okay. Before we get to that question, the thing is, first of all, we have to come up with a system which will combine nitrate.

So the first thing I pick was I chose a microbe called microbial -- called micrococcus, M-I-C-R-O-C-O-C-C-U-S, micrococcus, denitrificans, D-E-N-I-T-R-I-F-I-C-A-N-S. I feel like I'm in a spelling bee test. And that is a microbe come by from a place called American Type, T-Y-P-E, Culture Collection in Rockville, Maryland. It's a nonprofit organization. And they keep world-defined microbes in the freeze-dried form, and all of those thing got

2062823461

http://legacy.library.ucsf.edu/tid/wkq07a00/pdf Stanford Libraries industrydocuments.ucsf.edu/docs/hxgl0001

to define pass way.

If they are studying for this instance from nitrate, where would that end up with? It's well documented and what kind of solution we will to have to grow this thing, so it will carry out the reaction. So it's all known.

So we pick one that will do the job and we start it from that as a model. So we don't jump in to tobacco right away. You always go back to the basic and see if what people tells you, what you get is what they tell you. And that's the first thing we did.

Q At what stage did you move on to tobacco?

A We did that for a while to be sure all the nutrients are collect and then the pH, the temperature and the time, how long it takes for the nitrate we add to become converted and what is the concentration. How high can it go before it will shut off the reaction.

Q Were you successful in modifying nitrates in tobacco?

A In a bench scale. That means in a small fraction. In a bench scale using tobacco extract, yes.

Q And what do you mean by using tobacco

2062823462

http://legacy.library.ucsf.edu/tid/wkq07a00/pdf
Support provided by the Tobacco Industry Documents Project. http://www.industrydocuments.ucsf.edu/docs/hxgl0001

extract?

A Taking the tobacco extract from one of the processes which we know contains nitrate, because once you remove, you started with the model system to be sure that bacteria will react as what they say, and then you take the system and going into tobacco extract. Because tobacco extract may not react like in the pure system. Because you got lots of other substance in it.

Q Uh-huh.

A So we have to use tobacco extract. So we move from purer system into tobacco extract.

Q And where did the tobacco extract come from; did that --

A That came from Park 500.

Q Are there certain types of tobaccos that don't contain nitrates?

A I think all of them do. Just the degree of concentration.

Q What type of tobacco has the highest concentration of nitrates?

A Burley.

Q And then does -- what's -- bright does contain nitrates but at a lower concentration?

A Yes.

2062823463

http://legacy.library.ucsf.edu/tid/wkq07a00/pdf Digitized by the Internet Archive in 2014 http://www.industrydocuments.ucsf.edu/docs/hxgl0001

Q What about Oriental tobacco; does it contain nitrates?

A I think it has trace.

Q Now, you testified that you were successful in a -- on a bench scale using tobacco extract to modify the nitrate; were you successful using actual tobacco?

A We have never tried natural tobacco.

Q How did you measure success in terms of modifying nitrates?

A You measure the nitrate at the beginning of the reaction and at the end of the reaction.

Q What were the nitrates modified in to?

A In the particular system we picked, the whole purpose was that nitrate goes all the way through nitrogen, just like in the air.

Q And why didn't you ever try the modification on actual tobacco?

A Again, I have to go back to the establishing story. You need lots of moisture. You know, after the tobacco is cured, it probably doesn't contain more than 12 percent moisture. And it's too low for any enzyme reaction to take place.

Q Do you know if the nitrate modification using tobacco extract was ever used in the Park 500

2062823464

http://legacy.library.ucsf.edu/tid/wkq07a00/pdf
Support provided by the Industry Documents Library: http://industrydocuments.ucsf.edu/docs/hxgl0001

process?

A Would you repeat that again, please.

Q Do you know if the nitrate modification, which you were successful in using with tobacco extract, was ever used in the Park 500 process?

MR. McDONNELL: I'm going to object, because it isn't clear, I think, in the record what you mean by the "Park 500 process."

BY MS. BRECKENRIDGE:

Q Do you understand the question?

A Again, I have to ask, could you repeat that question again.

Q Okay. I'll ask it again.

You testified that you were successful on a bench scale using tobacco extract in modifying nitrates; was that ever used in any Philip Morris processing, whether for test purposes or for commercial purposes?

A No, I don't think so.

Q You never experimented with -- strike that.

Philip Morris never experimented with modifying nitrates in any of its processes?

A Any processes, by any method or just the micro --

2062823465

http://legacy.library.ucsf.edu/tid/wkq07a00/pdf
Support provided by the Industry Documents Library: http://www.industrydocuments.ucsf.edu/docs/hxgl0001

Q I'm talking about the -- your method, the microbial method.

A No.

Q And then -- so then using the microbial method, Philip Morris never used the microbial method to -- in any of its processes for developing commercial cigarettes?

A Not to my knowledge.

Q Okay. When did the microbial process for modifying nitrates end?

A I think mine end -- ended at somewhere around 1980.

Q And what was the next project you worked on?

A Well, back to the field again, back to the tobacco farm again.

Q And what -- I'm sorry?

A At that time, the company has a process called tobacco expansion. And the purpose is, if you have a cigarette here, you have a set volume, and you have to put tobacco into it to fill that volume. So if the tobacco has a bigger volume, you don't have to fill that much to fill that volume; okay. So there's a method called filling, F-I-L-L-N-G, power testing. That means you take a cylinder, 10 gram of tobacco.

2062823466

http://legacy.library.ucsf.edu/tid/wkq07a00/pdf
Support provided by the Industry Documents Library: industrydocuments.ucsf.edu/docs/hxgl0001

You put a known weight on it for a set period of time and see how much the volume you have. And that's the way to measure whether this tobacco has more volume; okay.

So at that time, there was a process called tobacco expansion that like in popcorn or puffed rice. Tobacco is -- puts through a heat cylinder and let it expand. So by mixing some of that, you can cut down the weight of the cigarette, the weight of the tobacco in the cigarette. So you don't have to put that much into it and still hold that volume.

So that was about the time we start to ask the question of the tobacco we buy, which grade is better to be used for expansion. And you cannot just go to the warehouse and pull things out and say this is from the top of the plant, this is from the middle of the plant, this is from the bottom of the plant, because from field to field, they might be different. And you end up comparing different things.

So we set out to do one study by going to a farm and ask them to separate their bottom stock, their middle stock, their top stock. And use those tobaccos to do the filling power and the expansion

2062823467

http://legacy.library.ucsf.edu/tid/wkq07a00/pdf Stanford Libraries industrydocuments.ucsf.edu/docs/hxgl0001

study, to determine which one got higher filling power before expansion, which one will expand better than the others. By knowing that, we don't just randomly pick the things to expand, but we can selectively pick which of the stock position is better for expansion. So we set out to do that study and that is also under the biochemical modification of tobacco.

Q That was my next question. How did this relate to other studies you would undertake under the biochemical modification part of this project?

A Well, in this instance we're concentrating on one thing, the filling power, nothing else, filling power, stock position and expansion.

So the only thing is we have to be sure, statistically, those plants are well designed where we take which stock position comes where and they came under the same curing conditions from the same field. It's irrigated the same way, fertilized the same way; okay. So that was our main concern, so that's the stock position and the curing.

And you have to understand these kind of things you cannot do one year only. Because if you rely on one season, you probably will be in big

2062823468

http://legacy.library.ucsf.edu/tid/wkq07a00/pdf Support provided by the Industry Documents Library. https://www.industrydocuments.ucsf.edu/docs/hxgl0001

trouble about making a wrong recommendation. So something like this, in the field, usually it runs about five years, five seasons. So that's what we did.

Q As part of the filler project, were tests taken of samples?

MR. McDONNELL: Well, I'm just not sure. Maybe he understands it. When you say "samples," I'm not --

BY MS. BRECKENRIDGE:

Q Were analytical tests conducted on samples taken from the tobacco used in the filler project?

MR. McDONNELL: Thank you. I apologize.

MS. BRECKENRIDGE: That's a better question.

THE DEPONENT: That's standard procedure.

BY MS. BRECKENRIDGE:

Q How often would tests be conducted on the samples?

A In this instance, I think just the finished cured products.

Q And were the results of the tests recorded?

A Yes.

2062823469

http://legacy.library.ucsf.edu/tid/wkq07a00/pdf
Support provided by the Industry Documents Library: http://www.industrydocuments.ucsf.edu/docs/hxgl0001

Q And were they correlated with stock position and other variables mentioned by you?

A Yes.

Q What type of tobacco was used in this project?

A Bright tobacco.

Q And why was bright tobacco used; do you know?

A Well, the growing area of tobacco in this country, okay, bright tobacco is the closest to Richmond. In the northern most point is about 60 miles away from here, and we have to count the driving distance.

Q Were nitrates measured as part of this project?

A We may have.

Q You may have, but you don't recall?

A Just for the stock position alone, we may have.

Q Does the nitrate content of tobacco vary according to stock position?

A You are testing my memory.

Q If you recall.

A It doesn't stick out. No, I can't.

Q Were there other aspects of the

2062823470

http://legacy.library.ucsf.edu/tid/wkq07a00/pdf
Support provided by the Industry Documents Library: http://www.industrydocuments.ucsf.edu/docs/hxgl0001

biochemical modification project which studied nitrates?

A Okay. I mentioned the fermentation. That's one. And during the study of stock position, this is -- this was a model system. We try to see how much sugar affect the filling power.

So we set up a model to see if we air-cure the bright tobacco, instead of flue-curing it, and use of the sugar inside of the tobacco, we assume that tobacco still contain the same size cell and same volume. If we compare the filling power, that might be able to tell us whether sugar has anything to do with the filling power.

And while we are doing that, we notice, you know, just all of a sudden it dawned on us, well, this thing doesn't have that much nitrate, the air-cure bright doesn't have that much nitrate as compared to Burley. So that was yes, we determined that.

MS. BRECKENRIDGE: Could you read that answer back, please.

(The following answer was read:
"ANSWER: Okay. I mentioned the fermentation. That's one. And during

2062823471

http://legacy.library.ucsf.edu/tid/wkq07a00/pdf
Support provided by the Tobacco Industry Documents Project. http://www.industrydocuments.ucsf.edu/docs/hxgl0001

the study of stock position, this is -- this was a model system. We try to see how much sugar affect the filling power. So we set up a model to see if we air-cure the bright tobacco, instead of flue-curing it, and use of the sugar inside of the tobacco, we assume that tobacco still contain the same size cell and same volume. If we compare the filling power, that might be able to tell us whether sugar has anything to do with the filling power.

And while we are doing that, we notice, you know, just all of a sudden it dawned on us, well, this thing doesn't have that much nitrate, the air-cure bright doesn't have that much nitrate as compared to Burley. So that was yes, we determined that.")

BY MS. BRECKENRIDGE:

Q Did you determine why the air-cured bright didn't have as much nitrate as Burley?

A The nitrate, the source of the nitrate comes from the nitrogen fertilizers used in the soil.

2062823472

http://legacy.library.ucsf.edu/tid/wkq07a00/pdf
Support provided by the Tobacco Industry Documents Library at the University of California, San Francisco. http://www.industrydocuments.ucsf.edu/docs/hxgl0001

And as a tradition, bright tobacco doesn't use that much nitrogen fertilizer as compared to Burley.

Q Were there other projects which you worked on which studied the amount of nitrate in tobacco?

A No.

Q Are you familiar with TSNA?

A I think it stands for tobacco specific nitrosamine.

Q Do you know -- that is what it stands for. Do you know how TSNAs are formed?

A No, I'm not familiar with that.

Q Do you know if there's a relationship between nitrates and the formation of TSNAs?

A No, I don't. It's not in my field, so...

Q Okay. Were you ever asked to develop a -- let me start over.

Were you ever asked to modify tobacco to prevent the formation of TSNAs during your career at Philip Morris?

A No.

Q To your knowledge, were you ever involved in any project whatsoever that dealt with the formation of TSNAs while you were employed at Philip Morris?

2062823473

http://legacy.library.ucsf.edu/tid/wkq07a00/pdf
Downloaded from industrydocuments.ucsf.edu/docs/hxgl0001

A No.

Q During your career at Philip Morris, did people discuss TSNAs with you?

A No.

Q After the filler project, what was the next project you worked on?

A Excuse me?

Q I'm sorry, after the filler project --

A Oh, the filling power.

Q Excuse me, I used the wrong --

A I work on tobacco aging study.

Q What was the objective of the tobacco aging study?

A Well, according to tradition, tobacco has to be aged before you can use it for cigarette-making.

And when tobacco is bought from the auction floor, after it's shipped to the company, it goes through a stemmery process.

The stem is removed and the tobacco lamina, leaves could be, say, that big with a stem inside of it after it's dried, so it go through a process of -- a mechanical process to remove the stems from the leaf.

And the leave probably end up with about

2062823474

http://legacy.library.ucsf.edu/tid/wkq07a00/pdf
Support provided by the Industry Documents Library: http://www.industrydocuments.ucsf.edu/docs/hxgl0001

that size, and it's comparted into a container, a wooden container called hogs head, pigs head. And it's compressed and it's stuck up in the warehouse for set number of years.

So those experience in tobacco said you definitely got to age it, otherwise, you cannot smoke it. But how long do you have to age it, why do you have to age it, we don't really know. You know, you just listen to the people and say you definitely have to.

When you are doing something basic, you have to leave world and step back from that and see, can you find it, what's really needed.

So we set up a study. The tobacco is the same as those coming through the door and packed the same way how we just took them, the different grades that proportionately speaking as what we buy and we kept them in the commercial warehouse like, you know, what's actually done, and we have the statistician to design the study to see how we sample it, how often we sample it and we do some of the chemical analysis, you know, the standard package. And then we take the tobacco as is, have it manually cut and handmade cigarette and had the people in some of the smoking panel, we have a small, maybe six people or so, just

2062823475

http://legacy.library.ucsf.edu/tid/wkq07a00/pdf
Support provided by the Legacy Tobacco Documents Library at the University of California, San Francisco. http://www.industrydocuments.ucsf.edu/docs/hxgl0001

smoke it and compare them and score them to see if they change from time to time.

So at the beginning, we have some tobacco -- some cigarette made and they are kept in cold storage, so every time we pick the new sample out, we go back and smoke it and control it and compare it. To see can we find the difference. And that went on for five years.

Q What conclusions did you draw regarding tobacco aging at the end of the study?

A Actually, we didn't find any difference. We can tell -- you know, in a small panel, if it's done in a big panel, I don't know. But in a small panel, they can hardly tell the difference.

Q And are you referring to the smokers' panel?

A I don't think we did.

Q When you say you couldn't tell any difference, was that that you couldn't tell any subjective difference?

A Subjectively or chemically.

Q Was there any difference when you -- on aged and nonaged tobacco when the standard package of chemical tests were conducted on samples?

A The only difference you may see is you

2062823476

http://legacy.library.ucsf.edu/tid/wkq07a00/pdf
Support provided by the Legacy Tobacco Documents Library at the University of California, San Francisco. http://www.industrydocuments.ucsf.edu/docs/hxgl0001

lose moisture, you lose weight. Chemically, no.

Q Did the nicotine content vary in the tobacco during the process of aging?

A I don't think so.

Q Was a final report prepared at the end of the study?

A Yes.

Q Would you have authored that report?

A Yes.

Q Who else worked on the project with you?

A That's a long time. Could be Gerry Nixon.

Q What was your next project?

A Oh, I think that can bring up to almost my retirement.

Q In the course of your work at Philip Morris, did you ever find a way to eliminate or reduce nitrates in tobacco?

MR. McDONNELL: Objection. Asked and answered.

BY MS. BRECKENRIDGE:

Q Other than the ways which you've earlier described, during the course of your work at Philip Morris, did you ever find a way to eliminate or reduce nitrates in tobacco?

2062823477

http://legacy.library.ucsf.edu/tid/wkq07a00/pdf
Submitted to the Industry Documents Library: industrydocuments.ucsf.edu/docs/hxgl0001

MR. McDONNELL: May I ask for clarification; when you say "you," are you saying Dr. Teng or are you saying Philip Morris?

BY MS. BRECKENRIDGE:

Q Actually, I'm referring to projects on which you worked. During the course of your employment at Philip Morris, did any of the projects on which you worked find a way to eliminate or reduce nitrates in tobacco, other than those you've already described?

A No.

Q REDACTED

A I don't know. Probably disbanded.

Q REDACTED

A I don't think there's any biochemist who has a plant background in the company.

Q

A REDACTED

Q

A

2062823128

http://legacy.library.ucsf.edu/tid/wkq07a00/pdf
Support provided by the Tobacco Industry Documents Library at the University of California, San Francisco. http://www.industrydocuments.ucsf.edu/docs/hxgl0001

Q

A

Q

REDACTED

A

Q

A No.

Q Okay. Are you familiar with The Tobacco Institute?

A Yes. I have heard of it.

Q Did you ever collaborate on any projects with The Tobacco Institute?

A No.

Q Are you familiar with -- are you familiar with CTR, the Council for Tobacco Research?

A No.

Q Have you had any contact with colleagues at other tobacco companies?

A No.

Q Did you ever collaborate on any projects with anyone outside of Philip Morris while you were employed at Philip Morris?

2062823479

http://legacy.library.ucsf.edu/tid/wkq07a00/pdf
Suntid/wkq07a00/pdf.industrydocuments.ucsf.edu/docs/hxgl0001

A No.

Q Have you had articles published on your work, Dr. Teng?

A Yes.

Q How many articles have you had published?

A I have one article published. Actually, it wasn't -- I am a co-author, because people use my sample. And they use the sample to show the analytical method that they have developed. It's called FTIR -- it's a computer-connected analytical method and took my stock position samples to do the study, and that's -- they have my name on it.

Q And what does that analytical method do?

A Oh, they just trying to show that method can be used to analyze, you know, some other tobacco component.

Q And what are the tobacco components that it analyzes?

A I don't remember.

Q Do you know when that was published?

A Could be somewhere around 1990, '91.

Q And was it someone at Philip Morris who -- who was the co-author on the article?

A Yes.

Q Who was that?

2062823480

http://legacy.library.ucsf.edu/tid/wkq07a00/pdf
Solutions.industrydocuments.ucsf.edu/docs/hxgl0001

A I think John Lephadt is one, L-E-P-A -- L-E-P-H-A-D-T or something.

Q And do you know why he used your stock samples?

A It's a well-documented, well-controlled sample, you know. We know the variety of sample used, tobacco used. It's Coker, C-O-K-E-R, Seed 319. You go to the auction floor, you mention the name, people say he knows or she knows tobacco. That's a very popular variety.

Q And any other articles published other than that one?

A No.

Q Have you ever given talks or presentations on your work at Philip Morris?

A In-house seminars, yes.

Q What type of in-house seminars have you given?

A Like a general seminar, so everybody can attend.

Q And what would the topic be?

A Mostly tobacco, the things I told you this morning.

Q Your work with tobacco modification?

A Yes, yes.

2062823481

http://legacy.library.ucsf.edu/tid/wkq07a00/pdf
Support provided by the Industry Documents Library: http://industrydocuments.ucsf.edu/docs/hxgl0001

Q What departments in Philip Morris would be interested in your work on tobacco modification?

MR. McDONNELL: Objection. Calls for speculation.

MS. BRECKENRIDGE: You know --

THE DEPONENT: I don't know who can use it. You know, except that's a basic knowledge that we have.

BY MS. BRECKENRIDGE:

Q Did the people who attended your presentations on the topic mostly come from one or a couple of departments?

A No.

Q Would they mostly come from R & D?

A No, it's a R & D seminar. So that's for R & D only.

MS. BRECKENRIDGE: Let's go off the record.

(Discussion off the record.)

(Break)

MS. BRECKENRIDGE: This is our first exhibit.

2062823482

http://legacy.library.ucsf.edu/tid/wkq07a00/pdf
Source: http://www.industrydocuments.ucsf.edu/docs/hxgl0001

(TENG EXHIBIT NO. 1 was marked.)

MS. BRECKENRIDGE: Dr. Teng, the court reporter has handed you Exhibit 1 for this deposition, and it is a Philip Morris document that I'm going to ask you to take a look at it. It is a report entitled "Biochemical Special Investigation 6902, 1985 Annual Report."

I encourage you to take as much time to look at it as you wish, but I will also direct your attention to Page 41 where you are mentioned. But, as I said, please take as much time as you need to look at it. And then I'm going to ask you -- ask you several questions.

THE DEPONENT: I have a question here. On the cover page, I'm not on the distribution.

MS. BRECKENRIDGE: No, you are not. I'm going to ask you about that too --

THE DEPONENT: Okay.

MS. BRECKENRIDGE: -- but I wanted to show you the other area I'll be asking you about as well on Page 41.

MR. McDONNELL: Why don't you look at the Table of Contents, if that's all right.

MS. BRECKENRIDGE: Oh, please, take a

2062823483

http://legacy.library.ucsf.edu/tid/wkq07a00/pdf Support provided by the Industry Documents Library: industrydocuments.ucsf.edu/docs/hxgl0001

look at anything you wish.

MR. McDONNELL: Okay.

THE DEPONENT: Yeah.

BY MS. BRECKENRIDGE:

Q Dr. Teng, the exhibit I have -- the court reporter has handed you is a report entitled "6902 Biochemical Special Investigations, 1985 Annual Report." And, apparently, the author is A. H. Warfield. As you pointed out, you are not on the distribution list; have you ever seen this document before?

A No.

Q I directed your attention to Page 41, and at that place, there is a discussion of the bright tobacco curing study.

A Uh-huh.

Q First, let me ask you: Were you involved in a Project 6902, biochemical special investigations?

A No.

Q Is the bright tobacco curing study which is discussed at Page 41 of this exhibit the bright tobacco curing study that you testified about this morning?

A Could you repeat that question again,

2062823484

http://legacy.library.ucsf.edu/tid/wkq07a00/pdf
Support provided by the Tobacco Industry Documents Library at the University of California, San Francisco
http://www.industrydocuments.ucsf.edu/docs/hxgl0001

please.

Q Sure. Is the bright tobacco curing study discussed at Page 41 of this exhibit the bright tobacco curing study that you testified about this morning?

A Yes.

Q You've had a chance to read the description or the report of it in this document; have you?

A Now, yes.

Q Yes. When I asked you this morning about TSNAs, it was your testimony that you hadn't worked on any project that was -- that related to TSNAs; is that accurate?

A Correct.

Q Now that you've read this description of the bright tobacco curing study, does that change your recollection at all?

A No.

Q When you worked on the bright tobacco curing study, is it accurate to say that you did not know whether or not it related to TSNAs?

A People may come and ask me for samples, you know, so in that case, they usually don't ask what you are doing, we just provide samples.

2062823485

http://legacy.library.ucsf.edu/tid/wkq07a00/pdf
Suntid/wkq07a00.pdf.industrydocuments.ucsf.edu/docs/hxgl0001

Q Okay. So in this instance, whether or not someone was -- someone else was looking at your samples to determine TSNA formation or anything relative to TSNA, you wouldn't necessarily know; is that accurate?

A That's correct.

Q Is that what happened here, do you believe?

MR. McDONNELL: Objection. Foundation. Calls for speculation. You can answer the question, if you know the answer.

A Okay. Could you repeat that, please.

BY MS. BRECKENRIDGE:

Q I can ask a different question. As far as you were concerned, did the bright tobacco curing study, did you -- let me start over.

As far as you knew, did the bright tobacco curing study work that you did relate to TSNAs?

A No.

Q Do you know who would have used your samples to study TSNAs as described in here, this exhibit?

MR. McDONNELL: I don't understand -- objection. Vague.

2062823486

http://legacy.library.ucsf.edu/tid/wkq07a00/pdf
Support provided by the Tobacco Industry Documents.ucsf.edu/docs/hxgl0001

BY MS. BRECKENRIDGE:

Q Do you understand the question?

A I will, again, ask you to repeat it please.

MS. BRECKENRIDGE: Could you repeat the question, please.

(The following question was read:
"QUESTION: Do you know who would have used your samples to study TSNAs as described in here, this exhibit?")

THE DEPONENT: From this report, apparently, Dr. Warfield came and got some sample from me. And what he did with the samples, I wouldn't know.

BY MS. BRECKENRIDGE:

Q Okay. In the first paragraph of this section on bright tobacco curing study, the objective of the study is stated as, one, to determine the time-course of chemical, biological and physical factors which may affect the formation of TSNA in bright tobacco during flue-curing. The bright tobacco curing study was yours; is that accurate?

MR. McDONNELL: Objection. I think that

2062823487

http://legacy.library.ucsf.edu/tid/wkq07a00/pdf
Support provided by the Legacy Tobacco Documents Library at the University of California, San Francisco Library and Center for Knowledge Management. http://www.industrydocuments.ucsf.edu/docs/hxgl0001

misstates earlier testimony.

A I don't know whether he did his own study in any other way and called it a curing study or not, I don't know.

BY MS. BRECKENRIDGE:

Q The objective as stated here, number one, did anyone ever suggest to you that the objective of your study was to determine how these factors would affect the formation of TSNAs in bright tobacco during flue-curing?

MR. McDONNELL: Objection. Foundation.

A No.

BY MS. BRECKENRIDGE:

Q And the second objective stated is, two, to investigate the effects of known nitrosation inhibitors on TSNA formation during flue-curing; were you involved in that investigation at all?

A No.

Q So looking at this document doesn't change your earlier testimony that, as far as you were concerned, you were never involved in any study related to the investigation of TSNAs; is that accurate?

A Correct, it doesn't change my earlier statement.

2062823488

http://legacy.library.ucsf.edu/tid/wkq07a00/pdf
Support provided by the Legacy Tobacco Documents Library at the University of California, San Francisco Library and Center for Knowledge Management. http://www.industrydocuments.ucsf.edu/docs/hxgl0001

Q Dr. Teng, were you ever involved in any projects relating to altering nicotine levels in tobacco or cigarettes in any way?

A No, I haven't.

MS. BRECKENRIDGE: We have our next exhibit.

(TENG EXHIBIT NO. 2 was marked.)

MS. BRECKENRIDGE: Dr. Teng, I've handed you what's been marked as Teng Exhibit Number 2, which is a memo to L. F. Meyer from P. N. Gauvin, a Philip Morris interoffice correspondence dated October 11, 1977 and stamped "Confidential," and I'd like you to take a minute to read that, if you would, please.

MR. McDONNELL: Just so the record isn't confused, Counsel, there is a second document clipped to the one I got.

MS. BRECKENRIDGE: That is two. It is two memoranda. The second memoranda is a memoranda dated September 30, 1977 to Paul Gauvin from Ellen Moore. And it has been marked as one exhibit.

MR. McDONNELL: Okay.

BY MS. BRECKENRIDGE:

2062823489

http://legacy.library.ucsf.edu/tid/wkq07a00/pdf
Suntid/wkq07a00.pdf industrydocuments.ucsf.edu/docs/hxgl0001

Q Have you had a chance to read the exhibit, Dr. Teng?

A Yes.

Q Have you ever seen these memoranda before?

A No.

Q Have you been involved -- have you ever at any point in your career at Philip Morris been involved in increasing nicotine in smoke?

A No.

Q Do you know who L. F. Meyer is?

A I think that stands for Leo Meyer.

Q Do you know what Leo Meyer's position was in October of 1977?

A 1977. No, I don't know exactly. Either he was a manager or a director.

Q In the R & D directorate?

A Yes, yes.

Q Do you know who Paul Gauvin is?

A Paul Gauvin, at the time he was either a project leader or a manager.

Q Do you know --

A Under Leo Meyer.

Q Do you know what department he was in?

A He was in some kind of development.

2062823490

http://legacy.library.ucsf.edu/tid/wkq07a00/pdf
Support provided by the Tobacco Industry Documents Library at the University of California, San Francisco
http://www.industrydocuments.ucsf.edu/docs/hxgl0001

Q And do you know who Ellen Moore is?

A I don't recall this person.

Q Okay. And the second memorandum, which is dated September 30, 1977, the subject of the memorandum is increasing nicotine in cigarette smoke, survey of in-house work. And it states that, apparently, Ms. Moore at Mr. Gauvin's request has searched through the R & D report index and talked to people at R & D who may have done or known about work to increase nicotine delivery in cigarette smoke. And there is a list of about twelve or thirteen people and you are one of the people.

A Yes.

Q Do you have any idea what work of yours may have suggested that you'd been involved in Philip Morris's work to increase nicotine delivery in cigarette smoke?

A Well, since I'm the one working in the tobacco field, you know, it's directly related to tobacco leaves, but tobacco leaves comes as the way it comes. So I wasn't involved in any of the alteration of nicotine.

Q Okay. I'm sorry. Are you familiar with work done at Philip Morris to increase nicotine delivery in cigarette smoke?

2062823491

http://legacy.library.ucsf.edu/tid/wkq07a00/pdf
Suntid/wkq07a00.pdf.industrydocuments.ucsf.edu/docs/hxgl0001

A No, I don't.

Q Looking at the list of people, which includes your name, do you know what work any one of them was involved in at Philip Morris to increase nicotine delivery in cigarette smoke?

A I cannot tell from this, no.

Q Dr. Teng, during your time -- would you like a glass of water?

A No, I'm fine.

Q During your time at Philip Morris, were you involved in any studies of chemical compounds in tobacco smoke or cigarette smoke?

A Could you repeat that question, please.

Q During your time at Philip Morris, were you involved in any studies concerning compounds in tobacco smoke or cigarette smoke?

A In the smoke, no.

Q Does the term "biological activity" mean anything to you?

A Vaguely.

Q And what does it mean?

A From what I can remember now, it's referring to something like tobacco smoke, the effect of tobacco smoke on some kind of tasting system, like microbes, that kind of thing.

2062823492

http://legacy.library.ucsf.edu/tid/wkq07a00/pdf
Support provided by the Industry Documents Library: industrydocuments.ucsf.edu/docs/hxgl0001

Q During your time at Philip Morris, were you involved in any projects to modify tobacco for lower biological activity?

A I don't remember I did.

Q Did -- at any time time during your tenure at Philip Morris, were you ever asked to develop a safer tobacco?

A No.

Q Were you ever asked to develop a tobacco which would reduce biological activity?

A No.

Q Were you ever asked to determine whether a particular tobacco had lower biological activity?

A No.

Q During your tenure at Philip Morris, were you ever involved in any projects concerning the reconstituted tobacco process?

A Could you repeat that question again, please.

Q Yes, during your tenure at Philip Morris, were you ever involved in any projects which related to the reconstituted tobacco process?

A I think you might have to define the word "related to."

Q Okay. That's fair. Were you involved in

2062823493

http://legacy.library.ucsf.edu/tid/wkq07a00/pdf
Support provided by the Industry Documents Library: http://www.industrydocuments.ucsf.edu/docs/hxgl0001

any projects which involve the reconstituted tobacco process or any materials used in the reconstituted tobacco process?

A No.

Q Were you ever asked to modify any of the tobacco products which are used by Philip Morris in the reconstituted tobacco process?

A No.

Q Were you involved in reducing the nitrates in the reconstituted tobacco process at any time?

A That was the model we used to study reduction of nitrate.

Q And was that the testimony you gave earlier today?

A Yes.

Q Okay. Dr. Teng, were you, during your tenure at Philip Morris, involved in research in to smoke pH at all?

A No.

Q Did you do any research that related to smoke at all during your tenure at Philip Morris?

A No, I haven't.

Q During your tenure at Philip Morris, were you involved in any research related to ammonia in

2062823494

http://legacy.library.ucsf.edu/tid/wkq07a00/pdf
Stanford Libraries industrydocuments.ucsf.edu/docs/hxgl0001

tobacco?

A No.

Q During your time at Philip Morris, were you ever asked to destroy the results of any study or research you did?

A No.

Q As a scientist, do you think it would be appropriate for someone to ask you to destroy the results of any research or work you did?

A No.

Q Have you ever heard of anyone at Philip Morris being asked to destroy the results of research or work that was conducted on behalf of Philip Morris?

A I don't think so.

MS. BRECKENRIDGE: Dr. Teng, I have our third and final exhibit here.

(TENG EXHIBIT NO. 3 was marked.)

BY MS. BRECKENRIDGE:

Q I've handed you what's been marked as Teng Exhibit Number 3, which is a biomaterials science organizational chart. And I believe it reflects you as the project leader of the biochemical

2062823495

http://legacy.library.ucsf.edu/tid/wkq07a00/pdf
Support provided by the Industry Documents Library: http://industrydocuments.ucsf.edu/docs/hxgl0001

modification of tobacco group. I have only one question about this document; can you tell what year this is -- let me start over.

Can you tell the date of this organizational chart, Dr. Teng?

A This chart is very interesting. There's something I'm not aware of it. Yes, in this chart from the top down, C. H. O'Donohue, manager, J. A. Allison, secretary and then B. A. Semp, manager of applied technology. I don't know what this is there. So, apparently, I haven't seen this before. I will guess this will be somewhere around -- end of 1979 or 1980.

Q Did you not recall that B. A. Semp was the manager of applied technology?

A Not in this chart.

Q Dr. Teng, did you ever work on any project related to denitrification?

A Denitrification?

Q Of any process at Philip Morris?

MR. McDONNELL: Objection. Asked and answered.

MS. BRECKENRIDGE: I believe you can answer.

THE DEPONENT: Okay. That's the one I

2062823496

http://legacy.library.ucsf.edu/tid/wkq07a00/pdf Substantial text of https://www.industrydocuments.ucsf.edu/docs/hxgl0001

mentioned this morning.

BY MS. BRECKENRIDGE:

Q There are no others?

A No.

Q I asked you about the RL -- the reconstituted process, and I wasn't sure if I had covered the other processes?

A Because we used the material from RL, so...

MS. BRECKENRIDGE: Okay. Sorry.

Those are all my questions. Thank you for your time.

MR. McDONNELL: Let us have a couple of minutes to see if there's any follow-up on redirect. We'll be back in five minutes.

MS. BRECKENRIDGE: Yes.

(Break)

MR. McDONNELL: We're all done. I do want to designate this confidential and have the -- the provisionally confidential and have the ten days to let other people review it and see if there's anything we want --

MS. BRECKENRIDGE: That's fine. I just

2062823497

http://legacy.library.ucsf.edu/tid/wkq07a00/pdf
Support provided by the Industry Documents Library: industrydocuments.ucsf.edu/docs/hxgl0001

wanted to bring it up.

MR. McDONNELL: And thank you.

THE DEPONENT: Thank you for putting up with me.

And further this deponent saith not.

(Concluded at 1:40 p.m.)

2062823498

http://legacy.library.ucsf.edu/tid/wkq07a00/pdf
Support provided by the Tobacco Industry Documents Library at the University of California, San Francisco. http://www.industrydocuments.ucsf.edu/docs/hxgl0001

Daniel M. Teng

COMMONWEALTH OF VIRGINIA, to wit:

Subscribed and sworn before me this_____

day of_____, 1997.

My commission expires:

_____

Notary Public

2062823499

http://legacy.library.ucsf.edu/tid/wkq07a00/pdf
Support provided by the Tobacco Industry Documents Library at the University of California, San Francisco. http://www.industrydocuments.ucsf.edu/docs/hxgl0001

COMMONWEALTH OF VIRGINIA AT LARGE, to wit:

I, Tanya L. Wood, RPR, Notary Public in and for the Commonwealth of Virginia at large, and whose commission expires April 30, 1998, do certify that the aforementioned appeared before me, was sworn by me, and was thereupon examined by counsel; and that the foregoing is a true, correct, and full transcript of the testimony adduced.

I further certify that I am neither related to nor associated with any counsel or party to this proceeding, nor otherwise interested in the event thereof.

Given under my hand and notarial seal at Richmond, Virginia, this 29th day of November, 1997.

Tanya L. Wood

Tanya L. Wood, RPR - Notary Public
Commonwealth of Virginia at Large

2062823500

http://legacy.library.ucsf.edu/tid/wkq07a00/pdf
Support provided by the Industry Documents Library: http://industrydocuments.ucsf.edu/docs/hxgl0001

CHANGES REQUESTED TO THE DEPOSITION OF
DANIEL M. TENG
TAKEN ON NOVEMBER 19, 1997

Page/Line	From	To	Reason

Daniel M. Teng

2062823501

http://legacy.library.ucsf.edu/tid/wkq07a00/pdf
Support provided by the Tobacco Industry Documents Library. http://www.industrydocuments.ucsf.edu/docs/hxgl0001